

CREATING 3-DIMENSIONAL ELEMENTS

3-DIMENSIONAL OBJECTS

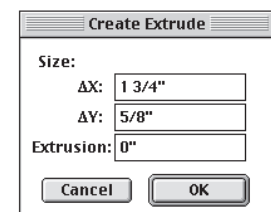
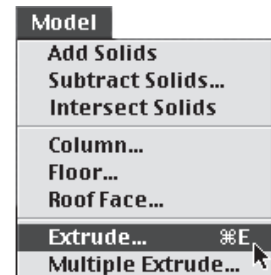
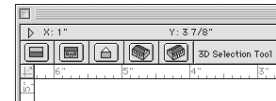
Some 3-dimensional objects are created by using tools on the *3D TOOLS* palette, which either create a 3D solids or a mesh object, and others are created by using tools on the *2D TOOLS* palette and converting them into 3D. Hybrid tools, such as the *WALL* tool, having both 2D and 3D elements, can only be used in *TOP/PLAN* view. A 3D object can have the *3D SELECTION* tool used similarly to the *2D SELECTION* tool. This 3D tool has five icons in the mode bar which correspond to five of the views under *VIEW>STANDARD VIEWS* and clicking the icons will change the view. Hitting the *X* key activates the *2D SELECTION* tool not the *3D SELECTION* tool.

CREATING 3D OBJECTS OUT OF 2D

Most objects, aside from text and dimensions, can easily be converted into 3D. With text there is a command that can be used, if it is TrueType text, which converts it to a polyline that can then be converted to 3D. Dimensions can not actually be converted, but can be projected to appear in 3D views with linked model layers. Objects made with the *EXTRUDE*, *MULTIPLE EXTRUDE*, and *SWEEP* commands are considered *VectorWorks native* objects. They have certain characteristics which allow them to be modified differently than mesh objects. There are several methods to convert a selected 2D object into 3D.

Extrude Command

When you use the *MODEL>EXTRUDE* command on a selected object, the *CREATE EXTRUDE* dialog box opens. Not only can you enter a value for the height under *EXTRUSION*, but you can also enter new values for *SIZE* into the $\Delta X [\pm X]$ and $\Delta Y [\pm Y]$ boxes. If you leave the *EXTRUSION* at 0, the object will still be converted into a 3D object. It will look like a 3D polygon but will be considered an extruded object. As a note, an object is not limited in height by the height of its layer, so if you have two floor levels with a staircase it is not a problem to extend the staircase and railings into the next layer.

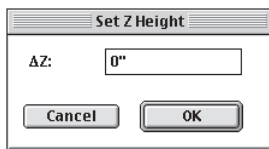


6. Creating 3-Dimensional Elements



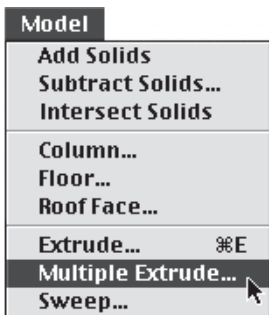
All objects will extrude towards the front of the screen regardless of the view. So if you are in *TOP/PLAN* view, the object will be extruded towards you which would be upwards when you look at the elevation. If you are in *BOTTOM* view, the object will still be extruded towards you, but this time it would be downwards when viewed in an elevation view. Keep this in mind when using the *EXTRUDE* command in any of the elevation views.

If the selected object has already been extruded, you can change the extrusion dimension by press/dragging one of its vertices if it is in an elevation view in a orthogonal projection. You can also use the *OBJECT INFO* palette regardless of the view or projection.



Other Height Extrusions

If you want to use the same value for the extrude as the active layer height, in other words, the $\Delta Z [\pm Z]$ value in the *LAYERS SETUP* dialog box, press the *Option [Shift]* key and then the *EXTRUDE* command. The object will automatically be extruded to the layer height of the active layer. If the active layer does not have a $\Delta Z [\pm Z]$ value already designated, the *SET Z HEIGHT* dialog box opens. The value entered for $\Delta Z [\pm Z]$ will be used for the extrude height and will automatically be entered for the $\Delta Z [\pm Z]$ value in the *LAYERS SETUP* dialog box. As a note to previous users – the *EXTRUDE* versus the *Option-EXTRUDE [Shift-EXTRUDE]* command has now been reversed. So previously where you would have used *Option-EXTRUDE [Shift-EXTRUDE]*, you would now just use *EXTRUDE*.

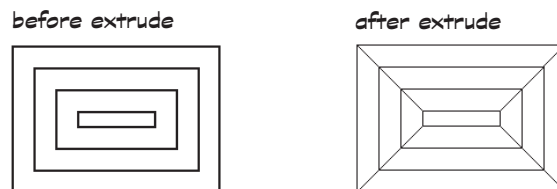


Multiple Extrude

If you want to create an extruded object that is a pyramid, cone, or some other odd shape, use the *MODEL>MULTIPLE EXTRUDE* command. Two or more 2D objects would need to be drawn and selected. The last object drawn would be placed at the top of the extrude. You can always change the order of the objects in the stack by using the *TOOL>SEND* commands or just *ROTATE* the object after it is created in the appropriate view.

When the command is used, the *CREATE EXTRUDE* dialog box opens similarly to when using the *EXTRUDE* command. The objects are automatically extruded and are evenly spaced apart, whether 2 objects or 10, no matter what *VIEW* is selected. You can also press the *Option [Shift]* key and then *MULTIPLE EXTRUDE* to have the object automatically extruded to the active layer height, or the $\Delta z [\pm z]$ value. If a value was not designated in the *LAYERS SETUP* dialog box, the *SET Z HEIGHT* dialog box opens similarly to the *Option [Shift]-EXTRUDE* command.

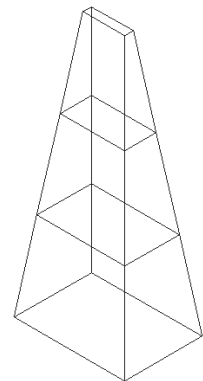
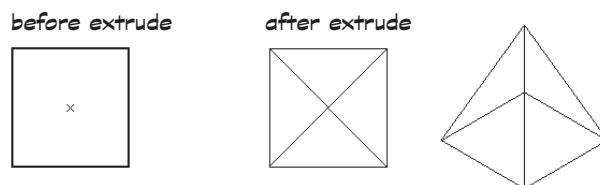
If you want the objects to have the same center, use the *OFFSET* tool to create the 2D objects, or select all of the objects and use the *TOOL>ALIGN>ALIGN OBJECTS* command with *T/B CENTERS* (top/bottom) and *L/R CENTERS* (left/right) selected.



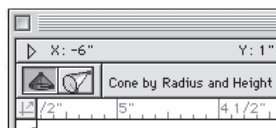
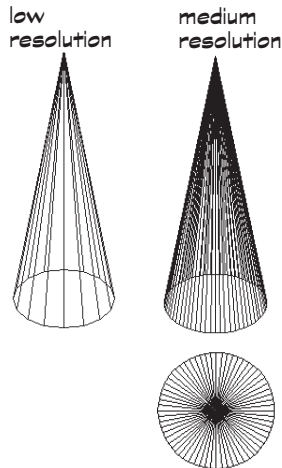
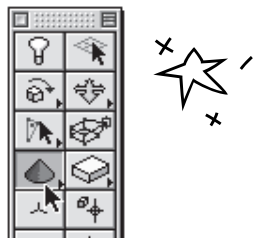
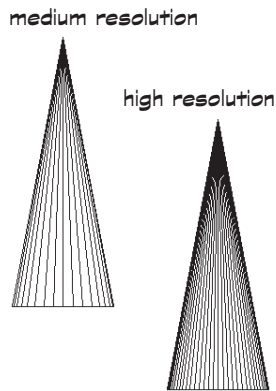
Cones And Pyramids

If you want the extruded object to come to a point, use the *2D Locus* tool to place a reference point and include that point as one of the selected 2-dimensional objects. The locus can be selected, deleted, and moved like any other 2-dimensional object.

A pyramid would be typically created out of a square and a locus point.

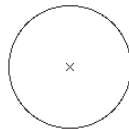


6. Creating 3-Dimensional Elements

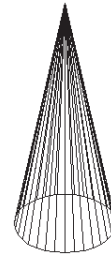
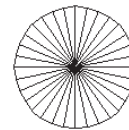


A cone would be created out of a circle and a locus point. When you create the circle use either the *CIRCLE BY DIAMETER* or the *CIRCLE BY RADIUS* icon and place the locus point. The *VECTORWORKS PREFERENCES* setting of *3D CONVERSION RES* will affect how the cone is displayed since it is a curved object.

before extrude



after extrude -
medium resolution



cone tool

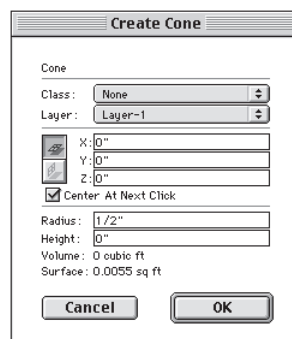
The new *CONE* tool located on the *3D TOOLS* palette easily creates cones. The objects created are considered a *3D solids object*. Basically either in *TOP* or a isometric view you would press at the centerpoint of the base, drag and release to create the radius, and then click to establish the height. So it is press, drag, release, and click. Notice while creating the object that there are two edit boxes available in the *data display bar* where you can enter the *RADIUS* and *HEIGHT* by hitting the *Tab* and *Enter* keys. If you are in *TOP* view where you can not see the height, the *SET Z HEIGHT* dialog box opens when you initially press.

The *VECTORWORKS PREFERENCES* setting of *3D CONVERSION RES* affects how the cone appears, although it does place more facets in all views other than the elevations, than this setting typically allows for in curved object types.

There are two modifier icons in the mode bar. If the first one is selected, the base is drawn on the *working plane*. If the second modifier icon is selected the base is also drawn on the *working plane* but it allows you to snap the tip of the cone to a point on another object, thereby tilting the cone off of the *working*

plane. If you use this second icon, the *HEIGHT* edit box does not constrain the object if you snap to another point.

If you double-click the tool icon, the *CREATE CONE* dialog box opens. This dialog box is similar to other *CREATE "OBJECT"* dialog boxes.



If *CENTER AT NEXT CLICK* is not checked, the center of the cone's base will be placed at the *ground plane* coordinates of *XYZ* if the top button is selected or the *IJK working plane* coordinates if the second button is selected. If *CENTER AT NEXT CLICK* box and the *XYZ* button are checked, the object is placed dependent upon the view. If in an elevation view, the base of the cone is placed on the *ground plane*. If in *TOP* view, the height of the object is centered on the *ground plane*. If in one of the isometric views or if the *IJK* button is checked, there does not seem to be a way to control the placement in relation to the *ground plane*. Whether this is intentional or whether it is something that will be fixed in future versions remains to be seen.

Modifying Multiple Extrudes

The original 2D objects, used for the extrude or multiple extrude, can be modified by using *ORGANIZE>EDIT GROUP*. This will affect the extruded object once *EXIT GROUP* is used. Use the *OBJECT INFO* palette to change the overall height by changing the value in the *EXTR* edit box.

